1. Introduction

Background

In May 1999, the Office of Policy, U.S. Department of Energy (DOE), asked the Energy Information Administration (EIA) to:

> ". . . undertake a service report that updates EIA's 1992 report on Federal Energy Subsidies and begins an examination of the energy market impact of these subsidies. The report will serve as a building block to promote understanding regarding the level and composition of direct market interventions which may affect the use of energy or the composition of energy supply, and how these interventions have changed since the 1992 report."

The Office of Policy's initial request focused exclusively on programs affecting primary energy that were specific to energy markets and provided a financial benefit.[1] In response, EIA prepared a service report, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, published in September 1999.[2]

Prior to the issuance of that report, the Office of Policy extended its May request to include Federal interventions affecting energy transformation (principally, electric power generation and transmission) and energy end use.[3] This report, prepared in response to the Office of Policy's further request, is intended to complement the findings of the first report, which described Federal programs related to primary energy.

Together, the two reports update a 1992 EIA report on energy subsidies.[4] In 1992, Congress requested that EIA produce a one-time study defining direct and indirect Federal energy subsidies, methods of valuation of such subsidies, and a survey of existing subsidies. The 1992 request required a broad survey of Federal interventions in energy markets. The current reports, which use a more narrowly focused definition of "subsidy," do not address all energy interventions that some might consider to be subsidies. Rather, it focuses only on programs that are specific to energy markets and provide a direct financial benefit. For example, accelerated depreciation policies that are applied throughout the economy both in the energy sector and in other activities are not evaluated in this report. Similarly, the impacts of regulatory programs are excluded. The reports do not make policy recommendations, evaluate the effectiveness of existing policy, or advocate or criticize any particular policy position—either those in effect when certain programs were established or those that are the subject of current policy debates.

This report incorporates several key changes that affect comparisons with EIA's 1992 report on energy subsidies. With regard to electricity, prior methodologies, developed in 1992 and applied to the electricity industry as a whole,

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[1]Primary energy is all energy consumed by end users, excluding electricity but including the energy consumed by electricity generators.

[2]Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999).

[3]Transformation refers to the production of electricity by transforming other forms of energy into electrical energy. End use refers to any application by which energy is consumed in the residential, commercial, industrial, and transportation sectors of the economy.

[4]Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992).

have been modified; the discussion of electricity supply first disaggregates the industry by its chief supply components and then analyzes the impacts that are realized by each portion of the industry. Moreover, because of their indirect nature and various uncertainties in quantification, no attempt is made to provide an estimate of the "total subsidy" to electricity supply. In the 1992 report, subsidies to electricity supply were quantified by reference to Federal budget outlays. That method is not applied here to electricity programs, because it fails to capture the full range of Federal support.

Several programs estimated in the 1992 report are no longer in existence, and several new programs have been introduced in the interim.[5] The broader definition of subsidy used in 1992 required an analysis of regulations affecting the conduct of energy markets. The 1992 report quantified a portion (about one-third) of Federal excises levied mostly on petroleum products and earmarked for General Fund application, then applied their sum as an offset to total energy subsidies; current Federal excises on energy products are estimated in this report but are not applied as an offset to the total estimate, because virtually all excises levied on motor gasoline are directed to the Highway Trust Fund.[6]

Definition of Subsidy and Subsidies Addressed

There is no universally accepted definition of subsidy. For the purposes of this analysis, a subsidy is a transfer of economic resources by the Government to the buyer or seller of a good or service that has the effect of reducing the price paid, increasing the price received, or reducing the cost of production of the good or service. A subsidy is conditioned on a particular economic performance. The net effect of such a subsidy is to stimulate the production or consumption of a commodity over what it would otherwise have been.[7]

Because all Government programs have costs and benefits, however, there has been a tendency for the term "subsidy" to lose specificity and acquire derogatory connotations. This study does not ascribe any normative values (negative or positive) to any subsidies. It does not weigh the costs and benefits of each subsidy, nor does it revisit the original considerations—correcting perceived market problems, achieving social objectives—which are the domain of policymakers. It should be noted that in the U.S. economy a wide array of industries and individuals benefit from various subsidies, not just energy producers and consumers.[8] This study identifies and, where it is both possible and feasible, quantifies certain energy subsidies, but it does not evaluate their merit.

The definition of subsidy used in this report is similar to that used by the Department of Commerce's International Trade Administration, an agency that monitors subsidies and coordinates a national response to the Subsidies Agreement of the World Trade Organization (WTO), of which the United States is a member. The International Trade

[5]Summary tables presented in the Executive Summary and Chapter 5 of this report include only those programs that are specified in the 1999 request. The estimates have been adjusted as noted in order to facilitate comparisons with the 1992 EIA report.

[6]At 18.4 cents per gallon, the motor gasoline portion alone would approach $21 billion, far offsetting all subsidies identified here. The 1992 EIA report applied only the 4.3 cents diverted to the General Fund, yielding an offset of $3.1 billion (1992 nominal dollars). Small portions of the excise go to the Leaking Underground Storage Tank Trust Fund, the Aquatic Resources Trust Fund, and the General Fund.

[7]See C. Shoup, *Public Finance* (Chicago, IL: Aldine Publishing Company, 1969), p. 145.

[8]For 1999, the Budget of the United States reports a loss of $87 billion associated with the exclusion of pension contributions and earnings; a loss of $76 billion associated with the exclusion of employer contributions for medical insurance premiums and medical care; and a loss of $53 billion resulting from the deductibility of mortgage interest on owner-occupied housing. See Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1999* (Washington, DC, 1998), Table 33-4.

Purpose and Limitations

This report provides a snapshot of a select set of Federal subsidies in U.S. energy markets. As defined by the requestor (the U.S. Department of Energy's Office of Policy), to be included in this report a subsidy must derive from a Federal program, be specific to energy markets, and provide a financial benefit to its recipients. This subsidy definition excludes many programs that have been considered subsidies in other analyses.[a] For example, all State programs are excluded, and tax-free bonds used by municipal electric utilities are excluded because non-energy companies such as municipal water and sewer facilities can also use them. Similarly, the tax-free pollution bonds and accelerated depreciation schedules used by investor-owned utilities are also excluded because of their use by non-energy companies.

When this report is compared with other analyses, careful attention should be paid to the definition of subsidy used in each report. There is no widely accepted definition of what constitutes a subsidy, and the definition used varies depending on the objective of a particular report. With respect to electricity markets, this report is not meant to address the relative advantages or disadvantages that ownership type (public or private) provides.

[a]See the bibliography in Appendix D for a list of other analyses.

Administration's definition is relatively broad,[9] but it does emphasize that "countervailable" subsidies, those for which remedies may be sought, must be "specific," that is, provided to a limited number of companies that may be engaged in the same endeavor, and must have caused adverse trade effects. The International Trade Administration adds that subsidies can take a variety of forms, and illustrates two in particular: export financing at preferential rates and tax exemptions for favored companies or industries. Subsidies provided for certain research and development, regional development, and environmental compliance purposes are non-actionable practices, as long as the assistance meets the criteria specified in the Subsidies Agreement.

Three broad categories of energy programs are considered: direct subsidies, indirect subsidies, and electricity support programs. Direct subsidies are characterized either by direct payments from the Federal Government to producers or consumers or by tax expenditures, which are provisions in the tax code that reduce the liability of persons or corporations undertaking certain actions.[10] Included in this report are:

- Direct payments under the Department of Health and Human Services' Low Income Home Energy Assistance Program (LIHEAP)
- Direct payment under two DOE programs—the Weatherization Program and the State Energy Program
- Three tax expenditures quantified by the Department of Treasury and reported by the Office of Management and Budget (OMB)—exclusion of interest on energy facility bonds from Federal taxation; exclusion of conservation subsidies provided by public utilities from the taxable income of the recipients; and tax credits and deductions for clean-fuel, alternative-fuel, and electric vehicles.

[9]"A subsidy can be almost anything a government does, if . . . a financial contribution is made . . . and a benefit is received." See web site www.ita.doc.gov/esel/e-splash.htm.

[10]Shoup characterizes tax expenditure generally as an imputed subsidy but argues that the firm will respond similarly whether the subsidy takes the form of a direct cash transfer or a reduction in taxable basis. Both should be recorded as "explicit subsidies," as firms, in effect, exercise discretion over the amount of the transfer. C. Shoup, *Public Finance* (Chicago, IL: Aldine Publishing Company, 1969), pp. 145-151.

Energy subsidies may also be indirect in character. Examples include the provision of energy or energy services at below-market prices, loans or loan guarantees, insurance services, and research and development activities. Research and development programs targeted to energy end use are quantified in this report, as are loans and loan guarantees.[11] Of loan guarantees, Shoup writes that, although "no money may in fact need to be paid by the government, it has nevertheless granted a subsidy."[12]

Several Federal programs that indirectly support the electricity industry are discussed and quantified in Chapter 4, but they are not included in summary numbers. Through the Tennessee Valley Authority (TVA), the Bonneville Power Administration, and the three other Federal Power Marketing Administrations (PMAs), the Federal Government brings to market large amounts of electricity, stipulating that "preference in the sale of such power and energy shall be given to public bodies and cooperatives."[13] Power generated at Federal facilities, many of which are hydroelectric dams built and operated by the Army Corps of Engineers and the U.S. Bureau of Reclamation, is sold on the wholesale market. This practice constitutes a direct rent subsidy by the Federal Government that results in a consumer surplus subsidy for preference customers and others[14] who consume the power, assuming that the PMAs are "inframarginal" producers.[15] The financial structure of Federal electricity suppliers may result in lower capital costs than would otherwise prevail in private markets.[16] The Federal Government indirectly supports portions of the electricity industry by sponsoring universal service in relatively high-cost areas through the Rural Utilities Service. The PMAs and TVA have also received congressional support in declaring certain costs to be "sunk." Any discussion of these support programs rests entirely on the assumption that certain aspects of a public enterprise may legitimately be compared with a private counterpart, an assumption that is not necessarily shared by all reasonable observers.

Several programs that could be included as subsidies under a different definition of that term are not addressed here. For example:

- Investor-owned utilities take advantage of accelerated depreciation of machinery and equipment (normal tax method), which is among the largest tax expenditures provided under law.[17] For property placed in service after 1980 and before 1987, the Accelerated Cost Recovery System (ACRS) provided accelerated depreciation schedules of 10 to 15 years. Since 1986, depreciation allowances have been determined under the Modified Accelerated Cost Recovery System (MACRS). It is believed that both the ACRS and MACRS often recover the cost of property faster than predecessor depreciation schedules.[18] However, because many other industries also have access to this tax provision, the accelerated depreciation allowance is not an energy-specific subsidy.[19]

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[11]An important insurance provision, the Price-Anderson Act, was detailed in *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, p. 42.

[12]C. Shoup, *Public Finance* (Chicago, IL: Aldine Publishing Company, 1969), p. 149.

[13]Flood Control Act of December 2, 1944 (58 Stat. 887, 890; 16 U.S.C.A. 825s), Section 5.

[14]Surplus power is made available to all consumers; investor-owned utilities also purchase it.

[15]D.N. Hyman, *Public Finance: A Contemporary Application of Theory to Policy* (New York, NY: Harcourt Brace College Publishers, 1999), pp. 250-255.

[16]Typically 100 percent debt financed, they bear no equity costs.

[17]Estimated at $32.5 billion in 1999. Office of Management and Budget, *Analytical Perspectives, 2000* (Washington, DC, 1999), Table 5-1.

[18]U.S. Congress, Joint Committee on Taxation, *Federal Tax Issues Relating to Restructuring of the Electric Power Industry*, JCX-72-99 (Washington, DC, October 15, 1999), pp. 26-27.

[19]A wide variety of public utility property may be eligible for favorable depreciation allowances, including property used primarily in furnishing electrical energy, water, sewage disposal, gas or steam distribution, telephone services, other communications services if furnished or sold by the Communications Satellite Corporation, or transportation of gas or steam by pipeline under certain circumstances. See U.S. Congress, Joint Committee on Taxation, *Federal Tax Issues Relating to Restructuring of the Electric Power Industry*, JCX-72-99 (Washington, DC, October 1999), p. 31.

- Private firms, including investor-owned utilities, also realize enhanced cash flows stemming from "deferred taxes," which are temporary differences arising from Federal income tax accounting and financial accounting treatment of a property item. Deferred taxes are substantial, but they are not addressed here because the same regulatory procedure is applied widely to gas, water, and telephone utilities in addition to electric utilities.

- Municipal electric utilities, rural electric cooperatives, the four PMAs, and the TVA are exempt from Federal income tax; this type of support is addressed, but only indirectly.[20]

- Because municipal utilities acquire their capital through tax-exempt bonds, they realize lower capital costs than private markets would otherwise provide.[21] Because this financing arrangement is available for a wide variety of public purposes, it is not "energy-specific."[22]

- A wide variety of regulatory procedures applied by the Federal Energy Regulatory Commission, the Securities and Exchange Commission, the Environmental Protection Agency, State-level regulators, and others may bestow benefits and disadvantages unevenly across the electricity industry and throughout the energy economy. In EIA's 1992 report, these types of interventions were included and categorized as "Regulation and Resource Management," estimated nominally at $523 million.[23]

Methods for Evaluating Costs of Subsidy and Support Programs

There are several approaches to measuring the effects of subsidies. Budget costs, the costs incurred or the revenue forgone by the Federal treasury as a consequence of implementing a program, are the most direct. Market impacts can also be examined, measuring the effects on energy prices and quantities associated with particular programs. A third method, measuring economic costs, involves partitioning budget costs into three parts—producer surplus, consumer surplus, and deadweight loss. Measuring economic costs can also be extended to consider net social costs or benefits, weighing such costs against the net economic cost of the program.

In this report, EIA has elected to use the measure of budget cost or revenue forgone to the greatest extent possible; in most cases, budget outlays—the actual expenditures by Federal agencies—are cited. For many research and development (R&D) programs, however, the available outlay data are more aggregated than the appropriations data. In certain cases, it is necessary to use the appropriations data. There are also several programs for which the Federal budget itself is not a meaningful measure of the concept of budget costs. Tax expenditures do not appear directly as line items in the budget. The U.S. Department of the Treasury estimates the cost of tax expenditures, which can be measured either as revenue losses or as outlay equivalents. This report uses outlay equivalents as the measure, in order to facilitate comparison with other sources of information.

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[20]See Chapter 4, specifically the discussion of historical costs absent any tax obligation.

[21]Investor-owned utilities also realize some reductions in their cost of capital by this means. The tax expenditure for certain energy facilities engaged in "local furnishings" is realized to some extent by investor-owned utilities. Along with other non-energy industries, investor-owned utilities benefitted from tax-exempt bonds issued in the 1980s for "pollution control devices"; the associated tax expenditure was valued at $440 million in 1999. See Office of Management and Budget, *Analytical Perspectives, 2000* (Washington, DC, 1999), Table 5-1.

[22]The Treasury Department estimates that if taxable bonds were used by municipal utilities, the U.S. Treasury would realize an additional $1.69 billion in 1998. Correspondence, Office of Tax Analysis, U.S. Department of Treasury, January 27, 2000.

[23]Energy Information Administration, *Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets*, SR/EMEU/92-02 (Washington, DC, November 1992), Table 2, p. 12.

In the case of electricity support programs, EIA believes that transactions appearing in the Federal budget indicate only selected capital expenditures or borrowing and repayment by Federal agencies, reflecting a small and unrepresentative fraction of the various agencies' financial positions and activities.[24] Federal electricity programs are indirect; the benefits are distributed widely, and the costs are incurred through a series of indirect transactions, most of which are stipulated by Congress, and all of which can be revisited at any time by Congress. Generally, these programs indirectly reduce the cost of electricity by reducing the underlying capital costs that are incurred when new power generation, distribution, and transmission facilities are built. Thus, evaluation of the programs rests on a comparison between the implicit price of capital for electricity suppliers and the price of capital incurred by companies not eligible for the programs. Ultimately, the comparison must somehow envision a hypothetical world where the programs have never existed.

Finally, this report cannot be read as an evaluation of the relative financial, operating, or productive merits or liabilities of different portions of the electricity industry. The question of relative efficiency between the publicly owned and investor-owned sectors of the industry has been examined in some detail by academics and by others,[25] with different assumptions and modeling approaches leading to divergent conclusions. This report is not intended to address that debate, only to identify elements of support that meet the criteria specified. Therefore, readers will find no conclusion, either explicit or implicit, regarding the relative productive efficiencies achieved by publicly owned and investor-owned electric utilities.

[24]For example, the Rural Utilities Service appropriation for fiscal year 1998 was $67 million, some portion of which is applied to electricity programs (the agency's responsibilities also include water and telecommunications. See Office of Management and Budget, *Analytical Perspectives, 2000* (Washington, DC, 1999), p. 438. The Service either approved or guaranteed loans to distribution and power supply cooperatives in the nominal amount of $1.245 billion in 1998. See U.S. Department of Agriculture, Rural Utilities Service, *1998 Statistical Report, Rural Electric Borrowers*, IP 201-1 (Washington, DC, August 1999), Table 1.

[25]Two important contributions are J.E. Kwoka, *Power Structure: Ownership, Integration, and Competition in the U.S. Electricity Industry* (Boston, MA: Kluwer Academic Publishers, 1996), and L.L. Peters, "Non-Profit and For-Profit Electric Utilities in the United States: Pricing and Efficiency," *Annals of Public and Cooperative Economics* (1993), pp. 575-604.